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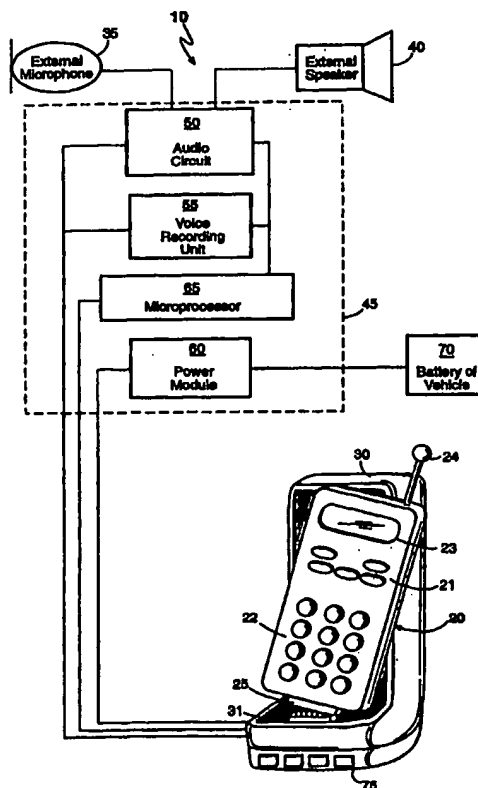
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US98/17476 (22) International Filing Date: 20 August 1998 (20.08.98) (30) Priority Data: 08/919,755 28 August 1997 (28.08.97) US (71) Applicant: ERICSSON, INC. [US/US]; P.O. Box 13969, Research Triangle Park, NC 27709-3969 (US). (72) Inventors: KARPUS, Thomas, J.; 118 Swan Quarter Drive, Apex, NC 27502 (US). KARPUS, Patricia, A.; 118 Swan Quarter Drive, Apex, NC 27502 (US). (74) Agents: BENNETT, David, E. et al.; Rhodes, Coats & Bennett, LLP, P.O. Box 5, Raleigh, NC 27602 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: A VEHICLE HANDSFREE KIT HAVING VOICE RECORDING PLAYBACK CAPABILITY**(57) Abstract**

The present invention relates to a voice recording and playback unit incorporated into a handsfree kit for a portable cellular telephone used in a vehicle which uses a single-chip voice recording/playback device to directly record one-way or two-way conversations occurring between the cellular telephone and either the external microphone or speaker components of the handsfree kit. When the telephone is up on a call, the voice recording and playback unit can record both sides of a conversation. When the telephone is not up on a call, the voice recording and playback unit functions as a memo pad and allows the user to dictate messages or memos. Control of the voice recording and playback unit is accomplished by the use of an actuator, such as a pushbutton mounted on the cradle of the handsfree kit or a sequence of keys on the keypad of the cellular telephone.

Records both sides of conversation
 - OR -
 Record memos / dictate



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A VEHICLE HANDSFREE KIT HAVING VOICE RECORDING PLAYBACK CAPABILITY**FIELD OF THE INVENTION**

The present invention relates to cellular telephone accessories, and more particularly to a voice recording and playback unit for a cellular telephone handsfree kit adapted to be mounted in a vehicle for providing hands-free operation of a cellular telephone.

BACKGROUND OF THE INVENTION

Portable handheld cellular telephones have become an important fixture in modern society. These cellular telephones typically are small enough to fit in a shirt pocket or a purse, conveniently enabling the user to carry the device at all times. This also allows the user to be immediately contacted by telephone anywhere in the world, whether the user is stationary or on the go. However, especially when the user is on the go, it is difficult for the user to memorialize or record important details of a telephone conversation.

Where portable cellular telephones are used in vehicles, handsfree kit accessories have typically been employed for allowing the user to carry on a telephone conversation while leaving both hands free for driving. These kits typically include a cradle matched to a specific model or series of cellular telephones. Once inserted into the cradle, the telephone is firmly held and secured. The cradle can be mounted in the vehicle within sight and easy reach of the user who is, typically, also the driver of the vehicle. The cradle is then connected, through controlling electronics, to a remote microphone and a remote

speaker also mounted within convenient proximity to the user. Mating connectors contained in the cradle and in the telephone operatively connect the telephone to the kit. Thus, once installed in the vehicle, the user is able to converse through the telephone by using the remote microphone and speaker.

Thus, vehicle handsfree kits have made it easy for drivers of vehicles to converse by cellular telephones. But often the driver of a vehicle has a need to make notes of a telephone conversation while the conversation is taking place. For example, it is not uncommon for a driver to receive complex directions to a destination by cellular telephone. It is obviously very difficult for the driver during the course of receiving those directions to make written notes during the course of the conversation, or even immediately after the conversation. Moreover, there are many other occasions when the driver of a vehicle would like the capability to record a cellular conversation that takes place while the driver is actually driving the vehicle.

Accordingly, there is a need for a cellular telephone handsfree kit that includes the capability of recording cellular conversations and playing them back at a selected time.

SUMMARY OF THE INVENTION

The present invention relates to a voice recording and playback unit incorporated into a handsfree kit for a portable cellular telephone used in a vehicle. The voice recording and playback unit employs a recording/playback unit to directly record one-way or two-way conversations occurring between the cellular telephone and either the external microphone or speaker components of the handsfree kit. When the telephone is up on a call, the voice recording and playback unit can record both sides of a conversation. When the telephone is not

up on a call, the voice recording and playback unit functions as a memo pad and allows the user to dictate and record messages or memos. Control of the voice recording and playback unit is accomplished by the use of an actuator, such as one or more pushbuttons mounted on the cradle of the handsfree kit or a sequence of keys on the keypad of the cellular telephone.

In one embodiment of the present invention, a controller is interposed between the cradle and the external microphone/speaker. The controller may or may not be interval with the cradle. Forming a part of the controller is an audio circuit, microprocessor, and the recorder/playback unit. The microprocessor is operated to selectively direct the same audio signals passing through the audio circuit to the recorder/playback unit where the audio signals are recorded. Further, the microprocessor is operated to selectively control playback by directing the recorded audio signals from the recorder/playback unit to the external speaker where the recorded conversation or message is played.

One use for the present invention is illustrated by the situation where the driver of the vehicle is receiving complex directions to a destination over the cellular telephone. With the voice recording and playback unit incorporated into the handsfree kit, the driver merely activates the recording actuator which is located on the cradle where the telephone is contained. This way, both sides of the conversation, including the directions to the destination and any questions which the driver may have, can be recorded and played back as the driver proceeds to the destination.

In another situation, the driver may desire to record a reminder or take down a message resulting from a completed telephone conversation. In some instances, the driver may just need to dictate a memo in the vehicle while the

details are clear. Using the voice recording and playback unit of the present invention, the driver simply activates the recording actuator on the cradle containing the cellular telephone. By activating the record function, the driver is able to dictate a memo or a message into the external microphone generally used for the hands-free operation of the cellular telephone. The voice recording and playback unit records the memo/message for later playback without activating the cellular telephone.

It is therefore not ??? in the present invention to provide a handsfree kit for a cellular telephone that permits the recording of one-way or two-way cellular telephone conversations.

Another object of the present invention is to provide a handsfree kit ??? referred to above with the capability of recording notes or memos when the cellular telephone assumes an "off call" mode.

Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings which are merely illustrative of such invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of the cellular telephone vehicle handsfree kit of the present invention.

Figure 2 is a schematic illustration of the controller of the handsfree kit illustrating the audio circuit and the recorder/playback unit of the controller.

DETAILED DESCRIPTION OF THE INVENTION

Now referring to the drawings, particularly Figure 1, the cellular telephone vehicle handsfree kit of the present invention is shown and generally indicated by the numeral 10. Kit 10 is a cellular telephone accessory for a vehicle which, when mounted in a vehicle, provides hands-free operation of a portable cellular telephone while allowing the user to selectively record voice communications transmitted through the cellular telephone. That is, the user may record both sides of an ongoing telephone conversation or record conversation occurring between occupants of the vehicle using a voice recording unit built into the kit 10. The voice recording unit is controlled by an actuator, such as a series of keys or pushbuttons, conveniently located near the user so that the user may quickly activate the kit 10 and then have both hands free for driving.

Kit 10 is intended to engage and hold a portable handheld cellular telephone 20 within a vehicle. Cellular telephone 20 is of a conventional design and as such includes a main body 21, a keypad area 22, a display 23, and an antenna 24. Formed about the lower portion of the cellular telephone 20 is a telephone-to-cradle connector 25 which enables the cellular telephone to be operatively connected to a cradle while accepted and held within the cradle. Details of the cellular telephone 20 are not dealt with herein because such details are not per se material to the present invention. Further, the design of such cellular telephones is well known and appreciated by those skilled in the art. Cellular telephones of the type disclosed herein are manufactured by Ericsson, Inc. of Research Triangle Park, North Carolina.

Kit 10 includes a cradle 30 which accepts and holds the telephone 20 within the vehicle. Formed about the cradle 30 is a cradle-to-telephone connector

31 which mates with the telephone-to-cradle connector 25 of the telephone 20. Cradle 30 is mounted within the vehicle and typically within convenient reach of the user, for instance, on or around the transmission tunnel/console area of the vehicle. Connection of the telephone 20 to kit 10 via the cradle 30 allows the telephone 20 to be operated in a hands-free mode while the user is in the vehicle. Thus, in the hands-free mode, the user may activate the telephone 20 to carry on a normal telephone conversation while leaving both hands free for driving.

In the hands-free mode, communication through the cellular telephone 20 is accomplished through an external microphone 35 and an external speaker 40, both operatively connected to the telephone 20 and located within the vehicle convenient to the head region of the user. That is, the external microphone 35 is used to transmit the user's voice to the telephone 20 while the external speaker 40 receives the incoming caller's voice from the telephone 20 and then broadcasts it to the user.

Controlling the functions of the kit 10 is a controller 45 that is interposed between the cradle 30 and the microphone 35 and speaker 40. Controller 45 directs communications between the telephone 20 held in the cradle 30 and both the external microphone 35 and the external speaker 40. Controller 45, as illustrated in Figure 1, comprises an audio circuit 50, a voice recording and playback unit 55, a power module 60, and a microprocessor 65.

The audio circuit 50 processes the voice communications transmitted between the external microphone 35 and the cellular telephone 20 and between the telephone 20 and the external speaker 40. The voice recording and playback unit 55 is connected to the audio circuit 50 (or to a signal field that connects to the audio circuit) for selectively recording voice communications between the

telephone 20 and the microphone 35 or speaker 40. That is, the recording and playback unit 55 can record a two-way conversation through the kit 10 or record ongoing voice communication within the vehicle, such as where the user simply desires to record a memo or to record the contents of a meeting between the passengers of the vehicle. The recorded voice communication can then be played back at a later time at the convenience of the user.

The power module 60 of the controller 45 is electrically connected to and distributes power from a battery 70 of the vehicle. Power module 60 provides power for the controller 45 and for the telephone 20 through the cradle 30.

Microprocessor 65 is also connected to the telephone 20 through the cradle 30, the audio circuit 50, the voice recording and playback unit 55, the power module 60, and an actuator 75 for the voice recording and playback unit 55. In this configuration, the microprocessor 65 controls the hands-free operation of the cellular telephone 20. At the same time, the actuator 75 controls the operation of the voice recording and playback unit 55 through the microprocessor 65. Actuator 75 may comprise, for example, one or more pushbuttons located on the cradle 30 or a sequence of keys that form a part of the keypad 22 of the cellular telephone 20.

Now referring to Figure 2, an electrical schematic is shown and demonstrates the interrelation of the external microphone 35, the external speaker 40, the audio circuit 50, and the voice recording and playback unit 55 of the kit 10. In providing hands-free operation of the cellular telephone 20, kit 10 utilizes audio signals which are transmitted between the telephone 20 and the controller 45. More particularly, the audio signals comprise an Audio From Mobile Station (AFMS) signal and an Audio To Mobile Station (ATMS) signal. The AFMS signal

originates in a conventional manner in the electronics of the telephone 20 and represents the voice of the incoming caller. The AFMS signal is then transmitted to the audio circuit 50 where it is directed to an AFMS processing circuit 80 where the AFMS signal is digitally processed by a digital processing unit 81, amplified by an amplifier 82, and broadcast through the external speaker 40. The ATMS signal, on the other hand, originates in the external microphone 35 in response to the voice of the user. Once originated, the ATMS signal is directed to an ATMS processor circuit 85 of the audio circuit 50 where it is amplified by an amplifier 86 and digitally processed by a digital processing unit 87 before being transmitted to the telephone 20. Thus, the ATMS circuit 85 is used, for example, where the user is replying to the incoming caller.

The voice recording and playback unit 55 is designed to record either an AFMS signal, an ATMS signal, or both. As shown in Figure 2, the recording and playback unit 55 taps into both the AFMS and ATMS signal lines between the audio circuit 50 and the cradle 30. The selectivity of the recording and playback unit 55 is controlled by the actuator 75. That is, by pressing the proper pushbutton or the correct key sequence on the keypad of the telephone 20, the user can activate or deactivate the recording and playback unit 55 at will. This selectivity is actuated by a pair of switches, 90 and 91, connected between the audio circuit 50 and the recording and playback unit 55. More particularly, the switches, 90 and 91, are controlled by the actuator 75 and the microprocessor 65.

When the telephone 20 is in a conversation mode ("on" call), such as where the user and an external caller are conversing, both AFMS and ATMS signals are being generated between the audio circuit 50 and the telephone 20. Activation of the actuator 75 directs the microprocessor 65 to close both switches,

90 and 91, and allows the user to record both sides of the conversation. However, when the telephone 20 is not in a conversation mode ("off" call), an ATMS signal can still be received from the external microphone 35. Therefore, when the telephone 20 is not in conversation mode and the actuator 75 is appropriately activated, the microprocessor 65 closes only switch 91 leading from the ATMS signal line and this signal is recorded by the recording and playback unit 55. This situation corresponds to instances where the user desires to record ongoing conversation within the vehicle or merely desires to record a memo or reminder.

Both taps from the AFMS and ATMS signal lines contain inline buffers, 95 and 96, which control the flow of the audio signals to the recording and playback unit 55. Once the audio signals have entered the recording and playback unit 55, the signals are summed by an adder 97 and filtered by a filter 98 prior to being recorded. In a preferred embodiment, the actual recording and playback is performed by a single-chip recording and playback device 99 wherein the voice communication is stored in a memory within the device 99.

In order to play back the recorded voice communication, the user need only activate the proper pushbutton or correct key sequence on the keypad of the telephone 20. The voice communications stored in the memory of the single-chip recording and playback device 99 is then filtered by a filter 100 and amplified by an amplifier 82 before being broadcast through the external speaker 40. Recall that the recording and playback unit 55 can be used for both one-way and two-way conversations. Thus, the playback could comprise, for examples, a memo dictated by the user while in the vehicle or traffic directions recited in a two-way conversation with an outside caller.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential character of the invention. For instance, a typical cellular telephone vehicle handsfree kit 10 has the controller 45 mounted remotely from the cradle 30 in order to reduce the size of the cradle 30. A smaller cradle 30 is easier to mount in a location most convenient to the user of the vehicle. On the other hand, the controller 45 could be an integral component of the cradle 30. In this configuration, the kit 10 would essentially be portable since all operable components except the external microphone and speaker would be contained within the cradle 30. The connection of the kit 10 to the battery 70 of the vehicle could then be established, for instance, through the cigarette lighter receptacle in the vehicle.

In addition, the actuator 75 for the voice recording and playback unit 55 is preferably mounted on or integral with the cradle 30. Since the intent is to mount the cradle 30 in a location in the vehicle convenient to the user, it inherently follows that the actuator 75 will also be in a convenient position if it is mounted on the cradle 30. However, it also follows that the actuator 75 may be mounted in a location remotely from the cradle 30. Therefore, the present embodiments are to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended Claims are intended to be embraced therein.

CLAIMS

What Is Claimed Is:

1. A system for recording and playing back voice communications directed to a cellular telephone, comprising:
 - a) a cradle for receiving and holding the cellular telephone;
 - b) an external microphone and speaker operatively associated with the cradle with the microphone functioning to direct voice communications to the cellular telephone and the speaker functioning to emit voice communication directed to it by the cellular telephone;
 - c) a controller operatively interposed between the microphone/speaker and the cradle for controlling voice communications being directed between the microphone/speaker and the cellular telephone held by the cradle;
 - d) the controller including a voice recording and playback unit for recording and playing back selected voice communications being transmitted between the microphone/speaker and the cellular telephone; and
 - e) an actuator operatively associated with the controller for actuating the voice recording and playback unit.
2. The system of claim 1 wherein the actuator includes a series of keys formed in the cradle.
3. The system of claim 1 wherein the controller includes an audio circuit for transmitting voice communications between the microphone/speaker

and the cellular telephone, and a microprocessor for controlling the audio circuit and the voice recording and playback unit.

4. The system of claim 1 wherein the voice communications transmitted between the microphone/speaker and cellular telephone have associated therewith audio signals and wherein the actuator is operative to selectively direct the audio signals to the voice recording and playback unit where the audio signals are recorded.

5. The system of claim 4 wherein the controller includes an audio circuit having an audio from mobile station (AFMS) circuit for transmitting AFMS signals and an audio to mobile station (ATMS) circuit for transmitting ATMS signals, and wherein the AFMS circuit, the ATMS circuit, and the voice recording and playback unit are disposed in parallel relationship.

6. The system of claim 5 wherein the AFMS circuit is interconnected between the speaker and cellular telephone while the ATMS circuit is interconnected between the microphone and the cellular telephone, and wherein the actuator is operative to direct either AFMS or ATMS signals to the voice recording and playback unit.

7. The system of claim 1 wherein the voice recording and playback unit includes an output that is communicatively connected to the external speaker.

8. The system of claim 1 wherein the voice recording/playback unit includes a record/playback chip and an audio signal summation device connected on an input side of the record/playback chip for summing audio signals being transmitted between the microphone/speaker and the cellular telephone.

9. The system of claim 1 wherein the controller includes a microprocessor that is operatively associated with the voice recording and

playback unit and the actuator for permitting one-way voice communications to be recorded by the voice recording/playback unit when the cellular telephone assumes an "off" call mode.

10. The system of claim 9 wherein the microprocessor further permits the recording of two-way voice communications when the cellular telephone assumes an "on" call mode.

11. The system of claim 1 wherein the voice communications transmitted between the microphone/speaker and the cellular telephone is based on audio to mobile station (ATMS) signals and audio from mobile station (AFMS) signals and wherein the controller includes a microprocessor means associated with the actuator and wherein the microprocessor means in association with the actuator is operative to selectively record either ATMS signals or AFMS signals or both.

12. The system of claim 11 wherein the controller includes an audio circuit including an AFMS circuit connected between the cellular telephone and the speaker and an ATMS circuit connected between the microphone and the cellular telephone, and wherein the voice recording and playback unit is operatively connected to the circuits carrying the ATMS and AFMS signals via a pair of switches which may be selectively activated by the actuator.

13. A cellular telephone vehicle handsfree kit used in a vehicle for receiving a cellular telephone, providing hands-free operation thereof, and selectively recording and playing back voice communications associated therewith, comprising:

- a) a cradle adapted to receive the cellular telephone and
operative to communicate voice communications

therethrough, said cradle forming an electrical connection with the cellular telephone when the cellular telephone has been received by the cradle;

- b) an external microphone;
- c) an external speaker;
- d) a controller electrically connected to the cradle, the external speaker, and the external microphone, said controller being operative to power, control, and record voice communications between the cellular telephone and the external speaker and external microphone, said controller comprising:
 - i) an audio circuit for processing voice communications transmitted between the cellular telephone and the external speaker and microphone;
 - ii) a voice recording and playback unit operatively connected to the audio circuit for selectively recording voice communications between the cellular telephone and the external microphone and speaker to produce a recording and for playing back the recording through the external speaker;
 - iii) an actuator operatively connected to the voice recording and playback unit for actuating the same;
 - vi) a power module electrically connected to the controller for providing power thereto and electrically connected to the cradle for powering the cellular telephone; and

- v) a microprocessor electrically connected to the power module, the voice recording and playback unit, the actuator, the audio circuit, and the cellular telephone through the cradle for controlling the functions thereof.

14. The accessory of claim 13 wherein the controller is integral with the cradle.

15. The accessory of claim 13 wherein the controller is disposed remotely to the cradle.

16. The accessory of claim 13 wherein the actuator comprises a plurality of actuating keys associated with the cradle and electrically connected to the controller, said actuating keys being operative to control the voice recording and playback unit.

17. The accessory of claim 13 wherein the voice communications transmitted between the cellular telephone and the external microphone and speaker comprise audio signals.

18. The accessory of claim 17 wherein the audio circuit includes an audio from mobile station (AFMS) circuit operatively connected between the cellular telephone and the speaker for transmitting AFMS audio signals and an audio to mobile station (ATMS) circuit operatively connected between the microphone and the cellular telephone for transmitting ATMS audio signals.

19. The accessory of claim 18 wherein the voice recording and playback unit is connected in parallel relationship with the AFMS and ATMS circuits, and wherein the actuator is operative to selectively direct the AFMS and ATMS audio signals to the voice recording and playback unit for recording of the audio signals.

20. The accessory of claim 13 wherein the voice recording and playback unit further includes an output which is operatively connected to the external speaker for playing back recorded voice communications.

21. The accessory of claim 13 wherein the microprocessor cooperates with the actuator to permit the voice recording and playback unit to record two-way voice communications when the cellular telephone assumes an "on" call mode and to permit the voice recording and playback unit to record one-way voice communications when the cellular telephone assumes an "off" call mode.

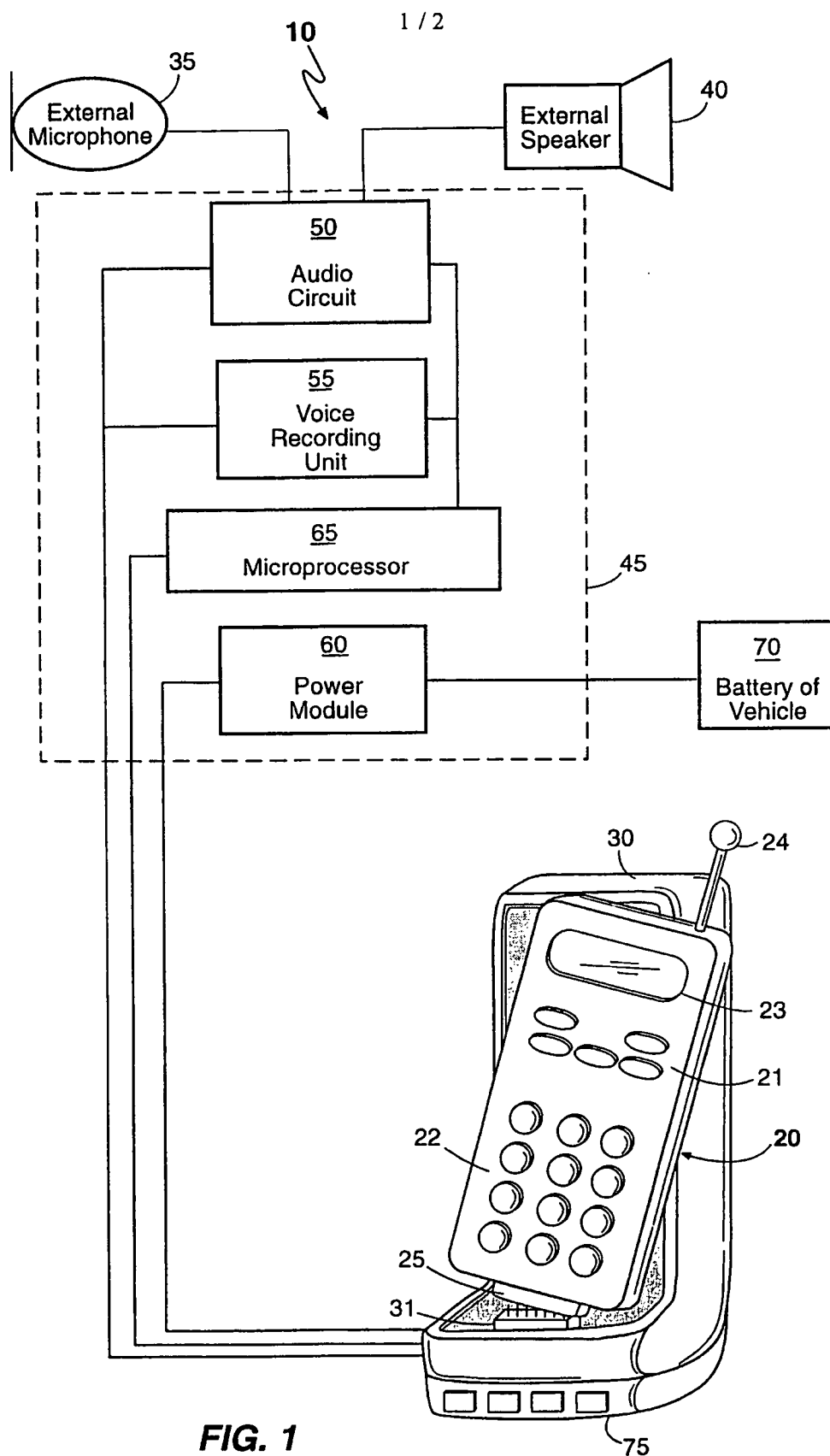


FIG. 1

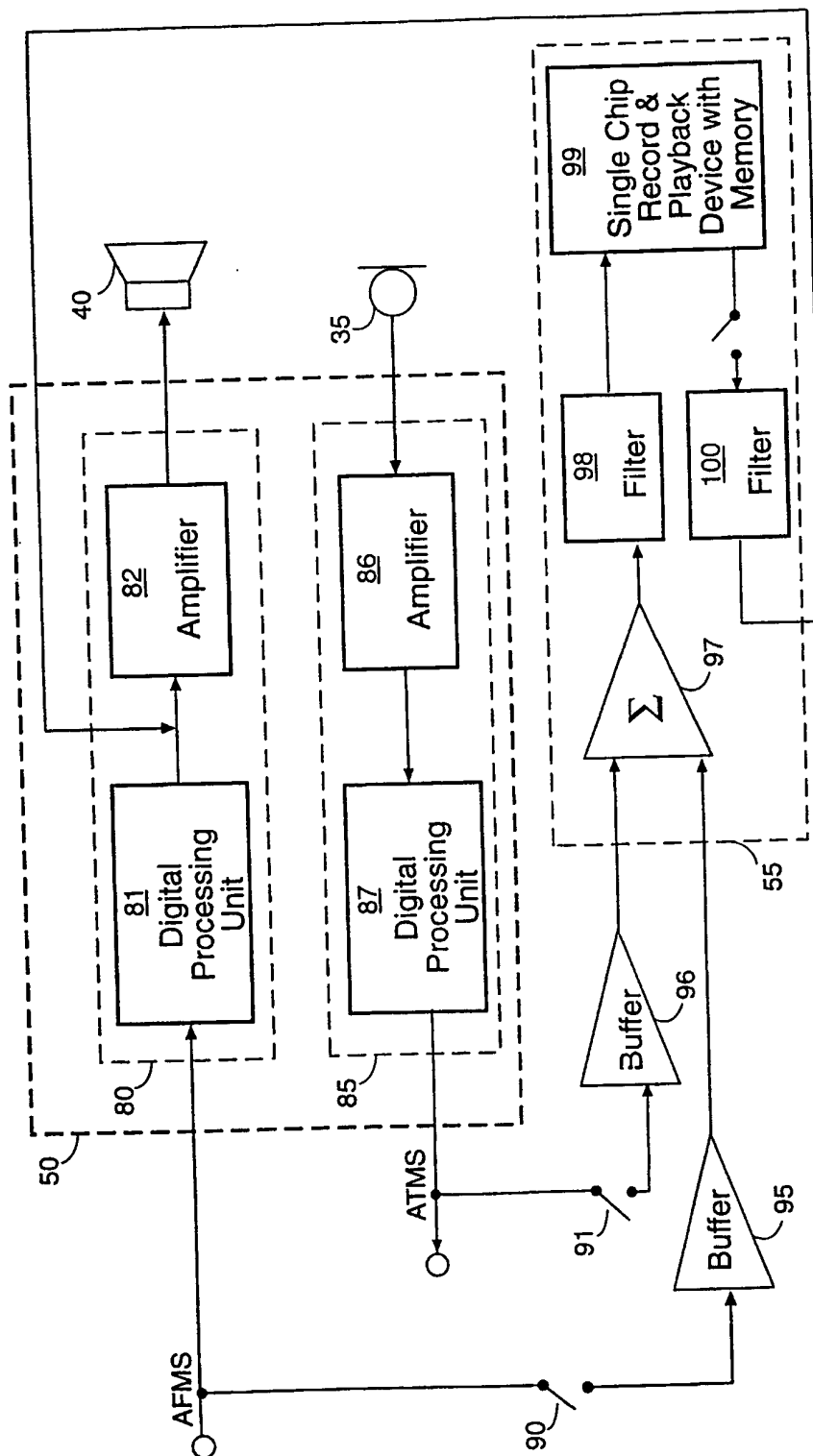


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/17476

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M1/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 18275 A (STANFORD TELECOMM INC) 13 June 1996 see page 3, line 20 - page 5, line 20 see page 8, line 9 - page 9, line 15 see figures 2,3 ---	1-21
X	US 5 333 176 A (TSUJISHITA YOJI ET AL) 26 July 1994 see abstract see column 2, line 22-26 see column 12, line 12-50 see column 20, line 35 - column 23, line 11 see claim 1 see figures 2,4,18,19 --- -/--	1-21

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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08/01/1999

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/17476

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	EP 0 762 711 A (NOKIA MOBILE PHONES LTD) 12 March 1997 see abstract; figure 1 ---	1-21
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INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

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